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While detailed directions for "experimental processes" (that is, analyses to be performed) are numerous, the usefulness of the manual is by no means limited to these, since the range of processes discussed in the text is exceedingly wide. The richness of the author's experience is reflected in many unusual suggestions as to technique and reagents, such, for example, as the employment of anthracene filters, and the use of sodium tungstate as an absorbent. The treatment of such topics as the variations in solubility of precipitated substances under varying conditions, colloids, the washing of precipitates, electrolysis, normal solutions and indicators is broad and scientific, and should give the thoughtful student a clear notion that analytical chemistry is not only much more than a question of manual skill, but something demanding his best intellectual efforts. In a few instances, notably the basic acetate process, the explanation of the part played by the various reagents might to advantage be somewhat elaborated.

The book is a noteworthy and valuable addition to the literature of analytical chemistry. It contains much that is of novel interest to a more experienced analyst, but it is probable that many teachers will question whether a beginner, lacking a background of experience, will be able to appreciate and use the descriptive material which is included in the text, but not directly applied to definite analyses. This material is, however, so arranged as to permit of selection, and it is all stimulating to the interested worker.

H. P. TALBOT

The Embryology of the Honey Bee. By JAMES ALLEN NELSON, Ph.D. Princeton University Press, Princeton, N. J., 1915.

A monograph of 282 pages with 95 figures in the text and six plates is an achievement in itself even when one deals with a comparatively well-known subject; but the present monograph is not simply a compilation. Dr. Nelson has incorporated in this work a great deal of his own research and many original observations. His account of the work done by others is accurate and, while preserving his

own point of view, he displays in his criticism the admirable quality of abstaining from personal remarks which so often mar the pages of scientific papers.

It would be very difficult to review the whole book in detail since many chapters naturally deal with facts already known to science, which merely find their confirmation here. I shall therefore endeavor only to emphasize some of the observations new to science and to point out certain shortcomings in this otherwise excellent book. Thus, in the chapter on cleavage, Nelson makes the interesting statement that "the size of the nuclei is, in a given egg, quite uniform from the beginning to the end of the period under consideration, *but varies considerably in different eggs*, ranging from 9-14 microns" (p. 21) (*italics are mine*). In every other respect Nelson's observations on cleavage are in harmony with those of other investigators. The figures accompanying this chapter are fairly good, but the addition of a figure representing a sagittal section through an egg at the end of the cleavage process would have been advisable. The chapter on the formation of the rudiments of the mid-intestine is accompanied by excellent figures and gives new support to the opinion expressed by the reviewer and others that the mesenteron is derived from the mesoderm, although Nelson believes that a choice is possible between this interpretation and that of *Carrière*, according to which the mesenteron rudiments may be considered to be purely blastodermal in origin, such a choice depending "largely on the theoretical bias of the interpreter." In the next chapter Nelson comes to the conclusion that both the "Rz" cells described by the reviewer and the "yolk plug" are identical with the "cephalo-dorsal body." This affords the reviewer an opportunity to state that he, too, is now of the same opinion. That the reviewer has never before come out with a statement to this effect, is due to the unusually personal note struck by his critics, even to an insinuation of motives other than a desire to find out the truth. In such cases silence seems always to be the best answer. With the fall of the interpretation

of the "Rz" cells as derivatives of the fused polar bodies and with the new light thrown on the spermatogenesis of the honey bee, the reviewer has been fully, if tacitly, converted to the interpretation of the origin of the sex-glands from the visceral wall of the mesodermal tubes as promulgated by Wheeler and Heymons and accepted by Nelson. Of especial interest are the chapters on segmentation and nervous system. It is rather unfortunate that instead of giving a diagram of his own, representing segmentation in insects, Nelson reproduces in Fig. 36 a diagram from Snodgrass, which can not be considered correct. Nelson himself is aware of this, as may be seen from his footnote on page 106. It is important to mention that Nelson describes and figures the evanescent appendages of the tritocerebral or intercalary segment in *in toto* views of the egg (VIIIa, 3Br). Although the truth of his statement can not be doubted, this as well as the following figures are not conclusive and we regret that no figure is given of a transverse section through the region of the tritocerebrum as described on page 106. Another point of interest is the absence of a segment between the mandibles and the maxillæ as described by Folsom for *Anurida*. The reviewer has never been able to accept Folsom's interpretation and finds in Nelson's description a new proof against the existence of such a segment. On the other hand, the rudiments of the second maxillæ (the future lower lip) in the honey bee appear well represented in Figs. X.-XIII. The rudimentary appendages representing the future thoracic legs disappear before the larva is hatched. The statement that the abdomen consists of 12 segments must be accepted as correct, but a drawing of the sagittal section showing all segments is wanting. A feature of great importance, especially for future investigators, is the table showing the rate of development. The data accumulated by Nelson for this are much more correct and detailed than those obtained by any of his predecessors. The drawings are well executed and for the most part original. Some of them are especially welcome, as for instance Figs. 1 and 2 showing the external

structure of the egg, Fig. 39 showing the cephalic portion of the nervous system of a newly hatched larva, Figs. 63 and 64 showing the tracheal system and the figures reproduced in the plates.

Many readers will probably regret that no account is given of oogenesis, of spermatogenesis or of fertilization. To be sure, the inclusion of these chapters would have increased the size of the book as well as required careful sifting of data and a great deal of original, tedious reinvestigation. At the same time it would be difficult to find a more appropriate place for these chapters than in a monograph on embryology. But it is scarcely fair to criticize the author for omitting to deal with a subject which does not necessarily come within the scope of his work. Dr. Nelson's is the first comprehensive monograph which has ever been printed on the embryology of the honey bee. It will be of great value both to the investigator and the student and we should be truly grateful to its author for having presented us with a work of such high standard.

ALEXANDER PETRUNKEVITCH

SCIENTIFIC JOURNALS AND ARTICLES

THE March number (Vol. 22, No. 6) of the *Bulletin of the American Mathematical Society* contains: Report of the twenty-second annual meeting of the society, by F. N. Cole; Report of the winter meeting of the society at Columbus, by H. E. Slaught; "On Pierpont's definition of integrals," by M. Fréchet; "Reply to Professor Fréchet's article," by J. Pierpont; Review of Carmichael's *Theory of Numbers and Diophantine Analysis*, by L. E. Dickson; "Notes"; and "New Publications."

THE April number of the *Bulletin* contains: "Some remarks on the historical development and the future prospects of the differential geometry of plane curves," by E. J. Wilczynski; "A certain system of linear partial differential equations," by H. Bateman; "Changing surface to volume integrals," by E. B. Wilson; "A new method of finding the equation of a rational plane curve from its parametric equations," by J. E. Rowe; "The physicist J. B. Porta as a geometer," by G.